

WHAT IS CLAIMED IS:

1. A method of releasing an SCH (Supplemental Channel) in a base station of a CDMA mobile communication system, comprising the steps of:

5 determining whether to transition from the current state to another state upon request of releasing the SCH;

generating a first message indicating release of the SCH and a next state to transition to and transmitting the first message to a mobile station; and

10 releasing the SCH and transitioning to the next state upon receipt of a second message from the mobile station, in response to the first message.

2. The method of claim 1, wherein the first message is an extended release message.

15 3. The method of claim 2, wherein the extended release message comprises:

an FPC_PRI_CHAN field indicating a forward channel by which forward inner-loop power control is performed;

20 an RPC_CHANNEL field indicating a channel to transmit power control bits;

a CH_IND field indicating a type of a physical channel to be released;

a CON_REF field indicating a connection of a service option to a specific mobile station;

25 a CON_REF_INCL field indicating whether the CON_REF field is included in the extended release message;

an SCR_SEQ field for discriminating a suspended state from a dormant state in a signaling layer;

an SCR_SEQ_INCL field indicating whether the SCR_SEQ field is included in the extended release message;

5 a PILOT_GATING_RATE field indicating a gating rate;

a GATE_RATE_INCL field indicating whether the PILOT_GATING_RATE field is included in the extended release message; and

a BLOB field including firsthand information about MAC (Medium Access Control) state transition.

10 4. The method of claim 3, wherein if CH_IND is not 0 and at least one of CON_REF_INCL, CON_REF, SCR_SEQ_INCL, and SCR_SEQ is not 0, the extended release message indicates a transition to the suspended state.

15 5. The method of claim 3, wherein if none of CH_IND, GATING_RATE_INCL, and PILOT_GATING_RATE are 0s and at least one of CON_REF_INCL, CON_REF, SCR_SEQ_INCL, and SCR_SEQ is not 0, the extended release message indicates transition to a control hold state.

20 6. The method of claim 3, wherein if both the fields CON_REF_INCL and CON_REF are 0s, the extended release message indicates transition to the dormant state.

25 7. The method of claim 1, wherein the first message is an extended release mini message.

8. The method of claim 7, wherein the extended release mini message indicates transition to the control hold state.

9. The method of claim 8, wherein the extended release mini message comprises:

- a CH_IND field indicating a type of a physical channel to be released;
- and
- a BLOB field including firsthand information about MAC state transition.

10. The method of claim 9, wherein the second message is an extended release response message.

11. The method of claim 1, wherein if the mobile station requests the SCH release, the base station determines the next state to transition to by receiving a third message from the mobile station in the state transition determining step.

12. The method of claim 11, wherein the third message is a peer-to-peer resource control message.

13. The method of claim 12, wherein upon receipt of the peer-to-peer resource control message, the base station determines whether to release the SCH and remain in an active state, or to transition to the control hold state, the suspended state, or the dormant state, based on the received peer-to-peer resource control message.

14. The method of claim 11, wherein the third message is a peer-to-peer resource control mini message.

5 15. The method of claim 14, wherein upon receipt of the peer-to-peer resource control mini message, the base station determines whether to release the SCH and remain in the active state, or to transition to the control hold state, the suspended state, or the dormant state, based on the received peer-to-peer resource control mini message.

10 16. A method of releasing an SCH in a mobile station of a CDMA mobile communication system, comprising the steps of:

determining whether the mobile station has received a first message, indicating release of the SCH and whether to perform state transition, from a base station during packet data communication on the SCH;

15 analyzing the first message upon receipt of the first message, releasing the SCH, and continuing the current state or transitioning to a next state; and

transmitting a second message to the base station after the state transition.

20 17. The method of claim 16, wherein the first message is an extended release message.

18. The method of claim 17, wherein the extended release message comprises:

25 an FPC_PRI_CHAN field indicating a forward channel by which forward inner-loop power control is performed;

an RPC_CHANNEL field indicating a channel to transmit power control bits;

a CH_IND field indicating a type of a physical channel to be released;

a CON_REF field indicating a connection of a service option to a specific mobile station;

a CON_REF_INCL field indicating whether the CON_REF field is included in the extended release message;

an SCR_SEQ field for discriminating a suspended state from a dormant state in a signaling layer;

an SCR_SEQ_INCL field indicating whether the SCR_SEQ field is included in the extended release message;

a PILOT_GATING_RATE field indicating a gating rate;

a GATE_RATE_INCL field indicating whether the PILOT_GATING_RATE field is included in the extended release message; and

a BLOB field including firsthand information about MAC state transition.

19. The method of claim 18, wherein if CH_IND is not 0 and at least one of CON_REF_INCL, CON_REF, SCR_SEQ_INCL, and SCR_SEQ is not 0, the extended release message indicates a transition to the suspended state.

20. The method of claim 18, wherein if none of CH_IND, GATING_RATE_INCL, and PILOT_GATING_RATE are 0s and at least one of CON_REF_INCL, CON_REF, SCR_SEQ_INCL, and SCR_SEQ is not 0, the extended release message indicates transition to a control hold state.

21. The method of claim 18, wherein both the fields CON_REF_INCL and CON_REF are 0s, the extended release message indicates transition to the dormant state.

5 22. The method of claim 16, wherein the first message is an extended release mini message.

23. The method of claim 22, wherein the extended release mini message indicates transition to the control hold state.

10 24. The method of claim 23, wherein the extended release mini message comprises:

a CH_IND field indicating a type of a physical channel to be released;
and

15 a BLOB field including firsthand information about MAC state transition.

25 25. The method of claim 24, wherein the second message is an extended release response message.

20 26. The method of claim 16, further comprising the step of transmitting a third message requesting release of the SCH and indicating whether a state transition will occur or not to the base station if the packet data transmission on the SCH is discontinued for a predetermined time period.

25 27. The method of claim 26, wherein the third message is a peer-to-peer resource control message requesting release of the SCH and including

information about transition to a control hold state, a suspended state, or a dormant state.

28. The method of claim 27, wherein the peer-to-peer resource control message includes a 16-bit REQ-BLOB field.

29. The method of claim 26, wherein the third message is a peer-to-peer resource control mini message requesting release of the SCH and including information about transition to a control hold state, a suspended state, or a dormant state.

30. An apparatus for releasing an SCH in a base station of a CDMA mobile communication system, comprising:

a MAC controller that determines a next state to transition to and generates an RC-unlock request signal indicating a release of an SCH and a state transition, upon receipt of an SCH release request during packet data communication on the SCH;

a resource controller (RC) that generates a signaling (SIG) release request signal upon receipt of the RC-unlock request signal and releases the SCH and resources according to the state transition upon receipt of a SIG-release confirm signal; and

a SIG controller that generates a first message and transmits the first message to a mobile station in response to the SIG-release request signal, receives a second message as a response message to the first message, and transmits the SIG-release confirm signal to the RC.

31. The apparatus of claim 30, wherein the first message is an extended release message.

32. The apparatus of claim 31, wherein the extended release message comprises:

an FPC_PRI_CHAN field indicating a forward channel by which forward inner-loop power control is performed;

an RPC_CHANNEL field indicating a channel to transmit power control bits;

a CH_IND field indicating a type of a physical channel to be released;

a CON_REF field indicating a connection of a service option to a specific mobile station;

a CON_REF_INCL field indicating whether the CON_REF field is included in the extended release message;

an SCR_SEQ field for discriminating a suspended state from a dormant state in a signaling layer;

an SCR_SEQ_INCL field indicating whether the SCR_SEQ field is included in the extended release message;

a PILOT_GATING_RATE field indicating a gating rate;

a GATE_RATE_INCL field indicating whether the PILOT_GATING_RATE field is included in the extended release message; and

a BLOB field including firsthand information about MAC state transition.

33. The apparatus of claim 32, wherein if CH_IND is not 0 and at least one of CON_REF_INCL, CON_REF, SCR_SEQ_INCL, and SCR_SEQ is not 0, the extended release message indicates a transition to the suspended state.

34. The apparatus of claim 32, wherein if none of CH_IND, GATING_RATE_INCL, and PILOT_GATING_RATE are 0s and at least one of CON_REF_INCL, CON_REF, SCR_SEQ_INCL, and SCR_SEQ is not 0, the extended release message indicates transition to a control hold state.

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35. The apparatus of claim 32, wherein if both the fields CON_REF_INCL and CON_REF are 0s, the extended release message indicates transition to the dormant state.

36. The apparatus of claim 30, wherein the first message is an extended release mini message.

37. The apparatus of claim 36, wherein the extended release mini message indicates transition to the control hold state.

38. The apparatus of claim 37, wherein the extended release mini message comprises:

a CH_IND field indicating a type of a physical channel to be released;
and

a BLOB field including firsthand information about MAC state transition.

39. The apparatus of claim 38, wherein the second message is an extended release response message.

40. The apparatus of claim 30, wherein if the mobile station requests the SCH release, the base station determines the next state to transition to by receiving a third message from the mobile station.

5 41. The apparatus of claim 40, wherein the third message is a peer-to-peer resource control message.

10 42. The apparatus of claim 41, wherein upon receipt of the peer-to-peer resource control message, the base station determines whether to release the SCH and remain in an active state, or to transition to the control hold state, the suspended state, or the dormant state, based on the received peer-to-peer resource control message.

15 43. The apparatus of claim 40, wherein the third message is a peer-to-peer resource control mini message.

20 44. The apparatus of claim 43, wherein upon receipt of the peer-to-peer resource control mini message, the base station determines whether to release the SCH and remain in the active state, or to transition to the control hold state, the suspended state, or the dormant state, based on the received peer-to-peer resource control mini message.

45. An apparatus for releasing an SCH in a mobile station of a CDMA mobile communication system, comprising:

25 a SIG controller that receives a first message indicating a release of an SCH and a state transition from a base station during packet data communication

on the SCH, generates a SIG-release indication signal requesting release of the SCH and resources associated with the state transition, receives a SIG-release response signal as a response for the SIG-release indication signal, and transmits a second message to the base station;

5 an RC that generates an RC-resource release indication signal in response to the SIG-release indication signal and transmits the SIG-release response signal to the SIG controller; and

 a MAC controller that receives the RC-resource release indication signal and transitions to a next state.

10 46. The apparatus of claim 45, wherein the first message is an extended release message.

15 47. The apparatus of claim 46, wherein the extended release message comprises:

 an FPC_PRI_CHAN field indicating a forward channel by which forward inner-loop power control is performed;

 an RPC_CHANNEL field indicating a channel to transmit power control bits;

20 a CH_IND field indicating a type of a physical channel to be released;

 a CON_REF field indicating a connection of a service option to a specific mobile station;

 a CON_REF_INCL field indicating whether the CON_REF field is included in the extended release message;

25 an SCR_SEQ field for discriminating a suspended state from a dormant state in a signaling layer;

an SCR_SEQ_INCL field indicating whether the SCR_SEQ field is included in the extended release message;

a PILOT_GATING_RATE field indicating a gating rate;

a GATE_RATE_INCL field indicating whether the PILOT_GATING_RATE field is included in the extended release message; and

a BLOB field including firsthand information about MAC state transition.

48. The apparatus of claim 47, wherein if CH_IND is not 0 and at least one of CON_REF_INCL, CON_REF, SCR_SEQ_INCL, and SCR_SEQ is not 0, the extended release message indicates a transition to the suspended state.

49. The apparatus of claim 47, wherein if none of CH_IND, GATING_RATE_INCL, and PILOT_GATING_RATE are 0s and at least one of CON_REF_INCL, CON_REF, SCR_SEQ_INCL, and SCR_SEQ is not 0, the extended release message indicates transition to a control hold state.

50. The apparatus of claim 47, wherein both the fields CON_REF_INCL and CON_REF are 0s, the extended release message indicates a transition to the dormant state.

51. The apparatus of claim 45, wherein the first message is an extended release mini message.

52. The apparatus of claim 51, wherein the extended release mini message indicates transition to the control hold state.

53. The apparatus of claim 52, wherein the extended release mini message comprises:

a CH_IND field indicating a type of a physical channel to be released;
and

5 a BLOB field including firsthand information about MAC state transition.

54. The apparatus of claim 53, wherein the second message is an extended release response message.

10 55. The apparatus of claim 45, wherein the mobile station transmits a third message requesting release of the SCH and indicating whether a state transition will occur or not to the base station if the packet data transmission on the SCH is discontinued for a predetermined time period.

15 56. The apparatus of claim 55, wherein the third message is a peer-to-peer resource control message requesting release of the SCH and including information about transition to a control hold state, a suspended state, or a dormant state.

20 57. The apparatus of claim 56, wherein the peer-to-peer resource control message includes a 16-bit REQ-BLOB field.

25 58. The apparatus of claim 55, wherein the third message is a peer-to-peer resource control mini message requesting release of the SCH and including information about transition to a control hold state, a suspended state, or a dormant state.